SECTION 15190
MECHANICAL IDENTIFICATION

PART I - GENERAL

3.1 Related Documents

A. All sections of Division 1.

B. Examine all drawings and all other Sections of the Specifications for requirements therein affecting the work of this Section. Work shall be coordinated with other trades prior to installation to prevent interference and relocations.

3.2 Description of Work

A. Extent of mechanical identification work required by this section is indicated on drawings and/or specified in other Division 15 sections.

B. Types of identification devices specified in this section include the following:

1. Painted Identification Materials.
2. Plastic Pipe Markers.
3. Plastic Tape.
4. Underground-Type Plastic Line Marker.
5. Valve Tags.
6. Valve Schedule Frames.
7. Plastic Equipment Markers.

C. Mechanical identification furnished as part of factory-fabricated equipment, is specified as part of equipment assembly in other Division 15 sections.

D. Refer to other Division 15 sections for identification requirements at central-station mechanical control center; not work of this section.

E. Refer to Division 16 sections for identification requirements of electrical work; not work of this section.

3.3 Quality Assurance

A. Manufacturer's Qualifications: Firms regularly engaged in manufacture of identification devices of types and sizes required, whose products have been in satisfactory use in similar service for not less than 5 years.

B. Codes and Standards:

1. ANSI Standards: Comply with ANSI A13.1 for lettering size, length of color field, colors, and viewing angles of identification devices.

3.4 Submittals

A. Product Data: Submit manufacturer's technical product data and installation instructions for each identification material and device required.

B. Samples: Submit samples of each color, lettering style and other graphic representation required for each identification material or system.

C. Schedules: Submit valve schedule for each piping system, typewritten and reproduced on 8 1/2" x 11" bond paper. Tabulate valve number, piping system, system abbreviation (as shown on tag), location of valve (room or space), and variations for identification (if any). Mark valves which are intended for emergency shut-off and similar special uses, by special "flags", in margin of schedule. In addition to mounted copies, furnish extra copies for Maintenance Manuals as specified in Division 1.

D. Maintenance Data: Include product data and schedules in maintenance manuals; in accordance with requirements of Division 1.

PART 2 - PRODUCTS

3.1 Acceptable Manufacturers

A. Manufacturer: Subject to compliance with requirements, provide mechanical identification materials of one of the following:

1. Allen Systems, Inc.
2. Brady (W.H.) Co.; Signmark Div.
3. Seton Name Plate Corp.

3.2 Mechanical Identification Materials

A. General: Provide manufacturer's standard products of categories and type required for each application as referenced in other Division-15 sections. Where more than single type is specified for application, selection is Installer's option, but provide single selection for each product category.

3.3 Painted Identification Materials

A. Stencils: Standard metal stencils, prepared for required applications with letter sizes generally comply with recommendations of ANSI A13.1 for piping and similar applications, but not less than 1 1/4" high letters for ductwork and not less than 3/4" high letters for access door signs and similar operational instructions.

B. Stencil Paint: Standard exterior type stenciling enamel; black, except as otherwise indicated; either brushing grade or pressurized spray-can form and grade.

C. Identification Paint: Standard identification enamel of colors indicated or, if not otherwise

indicated for piping systems, comply with ANSI A13.1 for colors.

3.4 Plastic Pipe Markers

A. Snap-On Type: Provide manufacturer's standard pre-printed, semi-rigid snap-on, color-coded pipe markers, complying with ANSI A13.1.

B. Pressure-Sensitive Type: Provide manufacturer's standard pre-printed, permanent adhesive, color-coded, pressure-sensitive vinyl pipe markers, comply with ANSI A13.1.

C. Insulation: Furnish 1" thick molded fiberglass insulation with jacket for each plastic pipe marker to be installed on uninsulated pipes subjected to fluid temperatures of 125□F or greater. Cut length to extend 2" beyond each end of plastic pipe marker.

D. Small Pipes: For external diameters less than 6" (including insulation if any), provide full-band pipe markers, extending 360 degrees around pipe at each location, fastened by one of the following methods:

1. Snap-on application of pre-tensioned semi-rigid plastic pipe marker.
2. Adhesive lap joint in pipe marker overlap.
3. Laminated or bonded application of pipe marker to pipe (or insulation).
4. Taped to pipe (or insulation) with color-coded plastic adhesive tape, not less than 3/4" wide; full circle at both ends of pipe marker, tape lapped 1 1/2".
5. Lettering: Manufacturer's standard pre-printed nomenclature which best describes piping system in each instance, as selected by Architect in cases of variance with name as shown or specified.
6. Arrows: Print each pipe marker with arrows indicating direction of flow, either integrally with piping system service lettering (to accommodate both directions), or as separate unit of plastic.

E. Large Pipes: For external diameters of 6" and larger (including insulation if any), provide either full-band or strip-type pipe markers, but not narrower than 3 times letter height (and of required length), fastened by one of the following methods:

1. Taped to pipe (or insulation) with color-coded plastic adhesive tape, not less than 1-1/2" wide; full circle at both ends of pipe marker, tape lapped 3".
2. Strapped-to-pipe (or insulation) application of semi-rigid type, with manufacturer's standard stainless steel bands.
3. Lettering: Manufacturer's standard pre-printed nomenclature which best describes piping system in each instance, as selected by Architect/Engineer in cases of variance with names as shown or specified.
4. Lettering: Comply with piping system nomenclature as specified, scheduled or shown, and abbreviate only as necessary for each application length.
5. Arrows: Print each pipe marker with arrows indicating direction of flow, either integrally with piping system service lettering (to accommodate both directions) or as a separate unit of plastic.

3.5 Plastic Duct Markers

A. General: Provide manufacturer's standard laminated plastic, color coded duct markers. Conform to the following color code:

1. Green: Cold air.
2. Yellow: Hot air.
3. Yellow/Green: Supply air.
4. Blue: Exhaust, outside, return, and mixed air.
5. For hazardous exhausts, use colors and designs recommended by ANSI A13.1.

B. Nomenclature: Include the following:

1. Direction of air flow.
2. Duct service (supply, return, exhaust, etc.).
3. Duct origin (from).
4. Duct destination (to).
5. Design cfm.

3.6 Plastic Tape

A. General: Provide manufacturer's standard color-coded pressure-sensitive (self-adhesive) vinyl tape, not less than 3 mils thick.

B. Width: Provide 1 1/2" wide tape markers on pipes with outside diameters (including insulation, if any) of less than 6", 2 1/2" wide tape for larger pipes.

C. Color: Comply with ANSI A13.1, except where another color selection is indicated.

3.7 Underground-Type Plastic Line Markers

A. General: Manufacturer's standard permanent, bright-colored, continuous-printed plastic tape, intended for direct-burial service; not less than 6" wide x 4 mils thick. Provide tape with printing which most accurately indicates type of service of buried pipe.

3.8 Valve Tags

A. Brass Valve Tags: provide 19-gage polished brass valve tags with stamp-engraved piping system abbreviation in 1/4" high letters and sequenced valve numbers 1/2" high, and with 5/32" hole for fastener.

B. Provide 1 1/2" diameter tags, except as otherwise indicated.

C. Provide size and shape as specified or scheduled for each piping system.

D. Fill tag engraving with black enamel.

E. Valve Tag Fasteners: Provide manufacturer's standard solid brass chain (wire link or beaded type), or solid brass S-hooks of the sizes required for proper attachment of tags to valves, and

manufactured specifically for that purpose.

F. Access Panel Markers: Provide manufacturer's standard 1/16" thick engraved plastic laminate access panel markers, with abbreviations and numbers corresponding to concealed valve. Include 1/8" center hole to allow attachment.

3.9 Valve Schedule Frames

A. General: For each page of valve schedule, provide glazed display frame, with screws for removable mounting on masonry walls. Provide frames of finished hardwood or extruded aluminum, with SSB-grade sheet glass.

3.10 Engraved Plastic-Laminate Signs

A. General: Provide engraving stock melamine plastic laminate, complying with FS L-P-387, in the sizes and thicknesses indicated, engraved with engraver's standard letter style of the sizes and wording indicated, black with white core (letter color) except as otherwise indicated, punched for mechanical fastening except where adhesive mounting is necessary because of substrate.

B. Thickness: 1/16" for units up to 20 sq. in. or 8" length; 1/8" for larger units.

C. Fasteners: Self-tapping stainless steel screws, except contact-type permanent adhesive where screws cannot or should not penetrate the substrate.

3.11 Plastic Equipment Markers

A. General: Provide manufacturer's standard laminated plastic, color coded equipment markers. Conform to the following color code:

1. Green: Cooling equipment and components.
2. Yellow: Heating equipment and components.
3. Yellow/Green: Combination cooling and heating equipment and components.
4. Brown: Energy reclamation equipment and components.
5. Blue: Equipment and components that do not meet any of the above criteria.
6. For hazardous equipment, use colors and designs recommended by ANSI A13.1.

B. Nomenclature: Include the following, matching terminology on schedules as closely as possible:

1. Name and plan number.
2. Equipment service.
3. Design capacity.
4. Other design parameters such as pressure drop, entering and leaving conditions, rpm, etc.

C. Size: Provide approximate 2 1/2" x 4" markers for control devices, dampers, and valves; and 4 1/2" x 6" for equipment.

3.12 Lettering and Graphics

A. General: Coordinate names, abbreviations and other designations used in mechanical identification work, with corresponding designations shown, specified or scheduled. Provide numbers, lettering and wording as indicated or, if not otherwise indicated, as recommended by manufacturers or as required for proper identification and operation/maintenance of mechanical systems and equipment.

B. Multiple Systems: Where multiple systems of same generic name are shown and specified, provide identification which indicates individual system number as well as service (as examples; Boiler No. 3, Air Supply No. 1H, Standpipe F12).

PART 3 - EXECUTION

3.1 General Installation Requirements

A. Coordination: Where identification is to be applied to surfaces which require insulation, painting or other covering or finish, including valve tags in finished mechanical spaces, install identification after completion of covering and painting. Install identification prior to installation of acoustical ceilings and similar removable concealment.

3.2 Ductwork Identification

A. General: Identify air supply, return, exhaust, intake and relief ductwork with duct markers; or provide stenciled signs and arrows, showing ductwork service and direction of flow, in black or white (whichever provides most contract with ductwork color).

B. Location: In each space where ductwork is exposed, or concealed only by removable ceiling system, locate signs near points where ductwork originates or continues into concealed enclosures (shaft, underground or similar concealment), and at 50' spacings along exposed runs.

C. Access Doors: Provide duct markers on each access door in ductwork and housings, indicating purpose of access (to what equipment) and other maintenance and operating instructions, and appropriate safety and procedural information.

D. Concealed Doors: Where access doors are concealed above acoustical ceilings or similar concealment, plasticized tags may be installed for identification in lieu of specified signs, at Installer's option.

3.3 Piping System Identification

A. General: Install pipe markers of one of the following types on each system indicated to receive identification, and include arrows to show normal direction of flow:

1. Plastic pipe markers, with application system as indicated under "Materials" in this section. Install on pipe insulation segment where required for hot non-insulated pipes.

B. Locate pipe markers and color bands as follows wherever piping is exposed to view in occupied spaces, machine rooms, accessible maintenance spaces (shafts, tunnels, plenums) and

exterior non-concealed locations.

1. Near each valve and control device.
2. Near each branch, excluding short take-offs for fixtures and terminal units; mark each pipe at branch, where there could be question of flow pattern.
3. Near locations where pipes pass through walls or floors/ceilings, or enter non-accessible enclosures.
4. Near major equipment items and other points of origination and termination.
5. Spaced intermediately at maximum spacing of 50' along each piping run, except reduce spacing to 25' in congested areas of piping and equipment.
6. On piping above removable acoustical ceilings, except omit intermediately spaced markers.

3.4 Valve Identification

A. General: Provide valve tag on every valve, cock and control device in each piping system; exclude check valves, valves within factory-fabricated equipment units, plumbing fixture faucets, convenience and lawn-watering hose bibs, and shut-off valves at plumbing fixtures, HVAC terminal devices and similar rough-in connections of end-use fixtures and units. List each tagged valve in valve schedule for each piping system.

1. Tagging Schedule: Comply with requirements of "Valve Tagging Schedule" at end of this section.

B. Mount valve schedule frames and schedules in ground floor machine room where directed by Architect/Engineer.

3.5 Mechanical Equipment Identification

A. General: Install engraved plastic laminate sign or plastic equipment marker on or near each major item of mechanical equipment and each operational device, as specified herein if not otherwise specified for each item or device. Provide signs for the following general categories of equipment and operational devices:

1. Main control and operating valves, including safety devices and hazardous units such as gas outlets.
2. Meters, gages, thermometers and similar units.
3. Pumps, compressors, and similar motor-driven units.
4. Heat exchangers, coils, heat recovery units and similar equipment.
5. Fans, blowers, primary balancing dampers and mixing boxes.
6. Packaged HVAC central-station or zone-type units.
7. Tanks and pressure vessels.
8. Strainers, filters, humidifiers, water treatment systems and similar equipment.

B. Optional Sign Types: Where lettering larger than 1" height is needed for proper identification, because of distance from normal location of required identification, stenciled signs may be provided in lieu of engraved plastic, at Installer's option.

C. Lettering Size: Minimum 1/4" high lettering for name of unit where viewing distance is less than 2'-0", 1/2" high for distances up to 6'-0", and proportionately larger lettering for greater distances. Provide secondary lettering of 2/3 to 3/4 size of the principal lettering.

D. Text of Signs: In addition to name of identified unit, provide lettering to distinguish between multiple units, inform operator of operational requirements, indicate safety and emergency precautions, and warn of hazards and improper operations.

E. Optional Use of Plasticized Tags: At Installer's option, where equipment is to be identified is concealed above acoustical ceilings or similar concealment, plasticized tags may be installed within concealed space to reduce amount of text in exposed sign (outside concealment).

3.6 Underground Piping Identification

A. General: During back-filling/top-soiling of each exterior underground piping systems, install continuous underground-type plastic line marker, located directly over buried line at 6" to 8" below finished grade. Where multiple small lines are buried in common trench and do not exceed overall width of 16", install single line marker.

3.7 Adjusting and Cleaning

A. Adjusting: Relocate any mechanical identification device which has become visually blocked by work of this division or other divisions.

B. Cleaning: Clean face of identification devices, and glass frames of valve charts.

3.8 Extra Stock

A. Furnish minimum of 5% extra stock of each mechanical identification material required, including additional numbered valve tags (not less than 3) for each piping system, additional piping system identification markers, and additional plastic laminate engraving blanks of assorted sizes.

1. Where stenciled markers are provided, clean and retain stencils after completion of stenciling and include used stencils in extra stock, along with required stock of stenciling paints and applicators.

3.9 Pipe Marking, Nameplates, Valve Tags

A. Identification of Piping: Provide identification on all piping that is exposed. Conspicuously identify piping with self adhering vinyl plastic directional flow arrows, color bands and pipe markers imprinted with legend, based on ANSI A13.1 "Scheme for the Identification of Piping Systems". Identify each pipe not less than every 25 feet, at least one band for each pipe riser and branch connection and adjacent to each valve.

B. Equipment Marking: Provide nameplates for all plumbing/electrical equipment. Nameplates -- black phenolic with white letters. Mechanically fastened to equipment.

C. Valve Tags: Provide on valves, brass or polished aluminum tags with stamped lettering and numbers filled in with black paint. Differentiate alphabetical prefix to show the type of service served by the valve. Provide two glazed frames and typewritten schedules of valves tagged. Locate and mount directories as directed by the Engineer.

3.10 Paragraph 3.1 B 15190

A. New markings shall be consistent with existing markings, and shall numerically continue from the last listed marking.

END OF SECTION 15190